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January 2, 2008

Mail Stop Certificate of Corrections Branch  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Re: U.S. Patent No.: 7,194,100  
Issued: March 20, 2007  
Title: "METHOD FOR INDIVIDUALIZING A HEARING AID"  
Filed: April 10, 2001  
Inventor: Volker Kuhnel et al.  
Our Docket: TSW-33495

Sir:

A Certificate of Correction under 35 U.S.C. 254 is hereby requested to correct Patent Office printing errors in the above-identified patent. Enclosed herewith is a proposed Certificate of Correction (Form No. PTO-1050) for consideration along with appropriate documentation supporting the request for correction.

It is requested that the Certificate of Correction be completed and mailed at an early date to the undersigned attorney of record. The proposed corrections are obvious ones and do not in any way change the sense of the application.

We understand that a check is not required since the errors were on the part of the Patent and Trademark Office in printing the patent.

Very truly yours,

  
Michael W. Garvey, Reg. No. 35878



## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 2

PATENT NO. : 7,194,100  
APPLICATION NO.: 09/829,700  
ISSUE DATE : March 20, 2007  
INVENTOR(S) : Volker Buhnel et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 3, line 26: Please delete "ottingen".  
Column 4, line 16: Please delete the letter "a" after gradient, and insert therefor --a--.  
Column 4, line 18: Please delete "a<sub>a</sub>", and insert therefor --a<sub>a</sub>--.  
Column 4, line 27, Please delete "a<sub>1</sub>", and insert therefor --a<sub>1</sub>--.  
Column 4, line 27, Please delete "a<sub>2</sub>", and insert therefor --a<sub>2</sub>--.  
Column 4, line 28, Please delete "a<sub>3</sub>", and insert therefor --a<sub>3</sub>--.  
Column 6, line 20, Please delete "the", and insert therefor --an--.  
Column 6, line 21, Please delete "the".  
Column 6, line 52, Please insert --a--before the word "level".  
Column 6, line 53, Please insert --a--before the word "hearing".  
Column 6, line 55, Please insert --a--before the word "constant".  
Column 6, line 56, Please insert --an--before the word "individual".

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

Michael W. Garvey, Pearne & Gordon LLP  
1801 East 9th Street, Suite 1200, Cleveland, Ohio

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*



**UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION**Page 2 of 2

PATENT NO. : 7,194,100

APPLICATION NO.: 09/829,700

ISSUE DATE : March 20, 2007

INVENTOR(S) : Volker Buhnel et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 7, line 20, Please insert --a--before the word "gradient".

Column 7, line 21, Please insert --a--before the word "hearing".

Column 7, line 23, Please insert --an--before the word "individual".

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

Michael W. Garvey, Pearne & Gordon LLP  
1801 East 9th Street, Suite 1200, Cleveland, Ohio

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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### Amendments to the Specification:

Please replace the last paragraph beginning at page 5 and continuing onto page 6, with the following replacement paragraph:

col. 3

One possibility to use the loudness individually perceived in response to selected acoustic signals as a variable for further processing is offered by the method schematically illustrated in Fig. 1 and described for instance by O. Heller in "Auditory Range Audiometry Employing the Categorization Method", Psychological Articles 26, 1985, or by V. Hohmann in "Dynamics Compression for Hearing Aids, Psychoacoustical Fundamentals and Algorithms", thesis at the Univ. of Göttingen, VDI-Verlag, Series 17, No. 93, or by Thomas Brand in "Analysis and Optimization of Psychophysical Procedures in Audiology", (Oldenburg: Library and Information System of the University, 2000 - 148 pp., Oldenburg, Diss., Univ., 1999, ISBN 3-8142-0721-1). According to that method, a person I is exposed to an acoustic signal A which can be varied in a generator 1 in terms of its spectral composition and its transmitted sound pressure level. The person I analyzes i.e. "categorizes" the acoustic signal A just heard by means of an input unit 3 within for instance eleven loudness steps or categories as illustrated in fig. 1. These steps are assigned numerical weights for instance from 0 to 10 categorical units (cu).

Please replace the second full paragraph on page 6 with the following replacement paragraph:

col. 3

In fig. 2 the loudness L, registered by category scaling per fig. 1, is expressed as function of the mean sound pressure level in dB-SPL for a sinusoidal signal of frequency  $f_k$ . As is evident from the pattern in fig. 2, the loudness  $[[K_{kN}]]$   $L_{kN}$  of the standard in the graph chosen increases in nonlinear fashion with the signal level; in a first approximation the slope for persons with normal hearing is expressed for all critical bands by the regression line indicated as N in fig. 2 with a gradient  $\alpha_N$  in [categories per dB-SPL].



individual HVLS/LOHL function, represented by the dashed line, established via three data sampling points for building a suitable model as explained below.

Please revise the sixth full paragraph of page 7 of the specifications as follows:

The following model has been found to be particularly useful in determining the gradient  $a$  as a function of hearing loss HV/HL (for hearing loss between 20 dB and 100 dB):

$$\log_{10} a = a_a \times HV/HL + b_a \times \log(HV/HL) + VP_{\text{consta}}$$

Please revise page 8 of the specifications as follows:

for  $20 \text{ dB} < HV/HL < 100 \text{ dB}$ ,

where

-  $a$  = gradient of the loudness function,

HV/HL = hearing loss in dB,

$a_a, b_a$  = constant function parameter, and

$VP_{\text{consta}}$  = the individual function parameter which adapts the HVLS/LOHL factor to the data sampling points  $a_1, a_2, a_3, \dots$  — col. 4

It should be mentioned at this juncture that, having been extrapolated from several data sampling points, the individual HVLS/LOHL factor illustrated in FIG. 3 shows less dispersion-related deviation than do the sampling points by themselves, thus providing a better reflection of changes in individual perception. Although it would be possible to obtain the targeted reference settings for the hearing aid already on the basis of this individual HVSL/LOHL factor, to determine the gradient  $a$  at 0 dB hearing loss by extrapolation (dotted curve in



### Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-2 (canceled).

3. (previously presented) A method for individualizing a hearing aid in adaptation to a loudness perception of an individual, said method comprising the steps of:  
adjusting the hearing aid using both (1) measured and quantified loudness perception parameters of the individual weighted by a first factor and (2) normal loudness perception parameters weighted by a second factor; and  
adjusting compression and/or amplification in the hearing aid, for which purpose the compression and, respectively, the amplification are each determined as a function of frequency, wherein  
for determining the compression, the loudness perception of the individual is quantified by means of a LOHL factor which is determined by loudness scaling at a minimum of one frequency.

4. (previously presented) The method as in claim 3, wherein the LOHL factor is modeled using the equation:

$$\log_{10} (\alpha) = a_a \times HL + b_a \times \log (HL) + VP_{\text{consta}} \text{ where}$$

$\alpha$  = a gradient of the loudness function,

HL = a hearing loss in dB,

$a_a$ ,  $b_a$  = constant function parameters, and

$VP_{\text{consta}}$  = (an) individual function parameter which adapts

0.01.6



col. 6

the LOHL factor to data sampling points  $\alpha_1, \alpha_2,$   
 $\alpha_3, \dots,$

and that  $VP_{consta}$  is determined on the basis of a loudness scaling performed at a minimum of one frequency.

3 ✓  
5. (previously presented) A method for individualizing a hearing aid in adaptation to a loudness perception of an individual, said method comprising the steps of:  
measuring and quantifying loudness perception parameters of the individual, weighted by a first factor;  
weighting of normal loudness perception parameters by a second factor;  
combining the weighted loudness perception parameters of the individual with the weighted normal loudness perception parameters to define a weighted loudness parameter; and  
using the weighted loudness parameter for adjusting the hearing aid, wherein  
compression and/or amplification is/are adjusted in the hearing aid, for which purpose the compression and, respectively, the amplification are each determined as a function of frequency, and wherein,  
for determining the amplification, the loudness perception of the individual is quantified by means of an HLL0 factor which is defined by loudness scaling at a minimum of one frequency.

4 ✓  
6. (previously presented) The method as in claim 5, wherein the HLL0 factor is modeled using the equation:

$$L_0 = a_L \times HL + b_L \times \log(HL) + VP_{constL}, \text{ where}$$

$$L_0 = \text{a level of loudness} = 0,$$

col 6



HL = <sup>could be</sup> (a) hearing loss in dB,  
a<sub>L</sub>, b<sub>L</sub> = (a) constant function parameters, and  
VP<sub>constL</sub> = (an) individual function parameter which adapts  
the HLL0 function to the data sampling points L<sub>01</sub>,  
L<sub>02</sub>, L<sub>03</sub>, . . . ,

and that VP<sub>constL</sub> is determined on the basis of a loudness scaling performed at a minimum of one frequency.

✓ 7. (previously presented) The method as in one of the claims 4 to 6 and <sup>6</sup>11, wherein the hearing loss is used for determining the frequencies at which loudness scaling is performed.

✓ 8. (previously presented) The method as in one of the claims 4 to 6 and <sup>6</sup>10 to <sup>6</sup>11, wherein the value of the weighted factors depends on the assumed and/or determined accuracy of the loudness scaling data.

✓ 9. (previously presented) The method as in claim 8, further comprising the selection of a value of 1/3 for the first factor and/or a value of 2/3 for the second factor.

✓ 10. (previously presented), A method for individualizing a hearing aid in adaptation to a loudness perception of an individual, said method comprising the steps of:

measuring and quantifying loudness perception parameters of the individual, weighted by a first factor;  
weighting of normal loudness perception parameters by a second factor;

combining the weighted loudness perception parameters of the individual with the weighted normal loudness perception parameters to define a weighted loudness parameter; and



using the weighted loudness parameter for adjusting the hearing aid, wherein compression and/or amplification is/are adjusted in the hearing aid, for which purpose the compression and, respectively, the amplification are each determined as a function of frequency, and wherein, for determining the compression, the loudness perception of the individual is quantified by means of a LOHL factor which is determined by loudness scaling at a minimum of one frequency.

<sup>6</sup> 11. (previously presented) The method as in claim ~~10~~<sup>5</sup>, wherein the LOHL factor is modeled using the equation:

$$\log_{10}(\alpha) = a_a \times HL + b_a \times \log(HL) + VP_{\text{consta}} \text{ where}$$

<sup>col 7</sup>  $\alpha = (a)$  gradient of the loudness function,

<sup>col 1</sup>  $HL = (a)$  hearing loss in dB,

$a_a, b_a =$  constant function parameters, and

$VP_{\text{consta}} = (an)$  individual function parameter which adapts the

LOHL factor to data sampling points  $\alpha_1, \alpha_2, \alpha_3, \dots$ ,

and that  $VP_{\text{consta}}$  is determined on the basis of a loudness scaling performed at a minimum of one frequency.

<sup>10</sup> ~~12~~. (previously presented) The method as in claim ~~11~~<sup>10 EXAM AND</sup>, further comprising the selection of a value of 2/3 for the first factor and/or a value of 1/3 for the second factor.

<sup>11</sup> ~~13~~. (previously presented) A method for individualizing a hearing aid in adaptation to a loudness perception of an individual, said method comprising the steps of:

measuring and quantifying loudness perception parameters of the individual, weighted by a first factor;